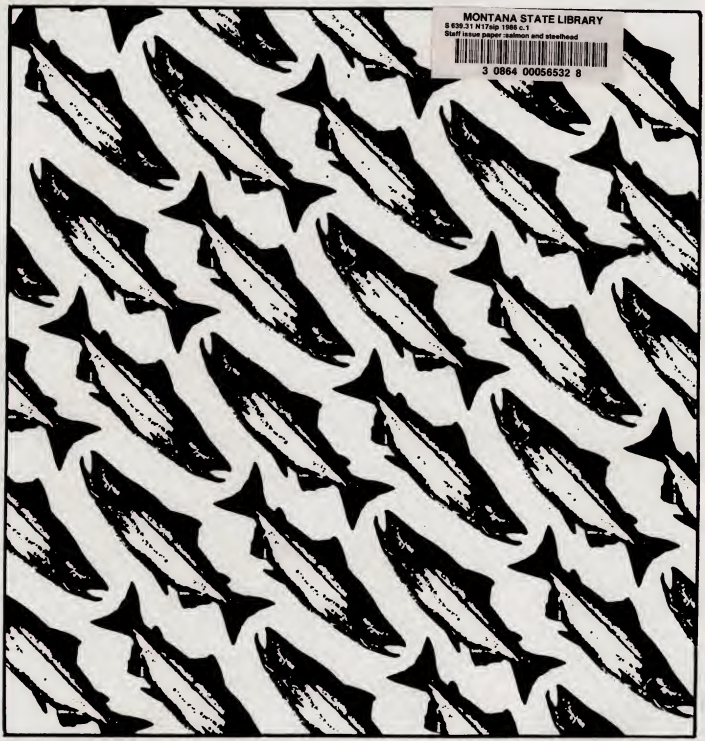
f Issue Paper

MON AND STEELHEAD
STEM OBJECTIVE AND POLICIES



NORTHWEST POWER PLANNING COUNCIL

October 22, 1986

SALMON AND STEELHEAD SYSTEM OBJECTIVE AND POLICIES

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The need for a coordinated, systemwide approach to rebuilding salmon and steelhead runs in the Columbia River Basin has been recognized since the Council's Fish and Wildlife Program was adopted nearly four years ago. That program, as now structured, is composed primarily of measures--hundreds of them. What is needed now is further definition of the objectives and goals those measures are intended to achieve and a clearer sense of how far the program will go in the future.

In the past year the Indian tribes, fish and wildlife agencies, the Council, and others have made substantial progress in building a systemwide framework for program measures. The tribes and fish and wildlife agencies have nearly completed the first major step in development of a management plan for exercising their responsibilities in a coordinated fashion to protect and rebuild upper Basin runs while providing harvest for Indian and non-Indian fishermen. In a parallel effort, they are forming a Columbia Basin Fish and Wildlife Authority, a new structure for expressing their common interests in salmon and steelhead production and protection. At the same time, the Council is developing a systemwide data base and planning model to aid system analysis of relationships among harvest, production, and mainstem passage. The Council has produced the first comprehensive collection of information on salmon and steelhead losses, and it has estimated the extent of those losses which may be attributed to development and operation of the hydropower system in the Basin. It also has sponsored workshops to begin the collection of information needed for planning in subbasins, and it has provided technical analysis and proposals related to the need to take genetic risks into account in planning production in the Basin.

This paper continues the public discussion of issues raised by system planning in the Basin. It proposes an interim program objective of doubling salmon and steelhead runs, with an emphasis above Bonneville Dam. It seeks comment on whether planning within that objective should: 1) emphasize monitoring and evaluation while implementing existing plans; or 2) focus now on planning for major new hatchery production, on the assumption that substantial increases in Basin salmon and steelhead runs will not be possible without construction of more hatcheries than those now planned or proposed.

In many respects, this paper amplifies the planning discussions in the Draft Amendment Document.[1] It reflects the premise that rebuilding salmon and steelhead in the Columbia River Basin must be accomplished through three interdependent and coordinated types of action: passage improvement, harvest management, and fish production. It is designed to facilitate discussion of appropriate policies to guide the Council's planning of ratepayer investments, as well as related production and harvest policies ultimately set by the fishery managers.

1/ On August 6, 1986, the Council approved release of the Draft Amendment Document (DAD) to provide the citizens of the Pacific Northwest region with an opportunity to comment on proposed amendments to the Council's program. The public comment period will run through December 15, 1986. Copies of the Draft Amendment Document are available by calling Judy Allender of the Council's Public Information/Involvement Division at 1-503-222-5161, 1-800-222-3355 (regional toll-free number) or 1-800-452-2324 (Oregon toll-free number).

For background, readers are referred to the Draft Amendment Document and to the technical planning report distributed to all who receive this issue paper. The technical report explains the basis for staff calculations of production increases and potential, provides new information on the system planning model being developed by the Council, describes possible input parameters and assumptions for mainstem passage survival calculations, and outlines elements of a genetics risk analysis, all of which could be used in subbasin planning. In addition, the staff has attached a list of references used in developing this paper. (See Attachment 1.)

Questions for Comment

The Council and its staff seek comment on the following questions. The Council will take this public comment into account in making final decisions on sections 203, 204 and related sections in the Draft Amendment Document released by the Council on September 1, 1986. As a result, this issue paper and comments in it will become part of the record of rulemaking proceedings leading to amendment of the program next February.

1. Planned increases. Is an increase of about 700,000 to 1,000,000 adult fish per year a reasonable estimate of the likely results of salmon and steelhead measures already in the program, major proposals in the Draft Amendment Document and other firmly planned, ratepayer-funded production projects? (See page 8 and Council Staff: Technical Planning Report.)

2. Interim objective. Should the interim objective for the Council's program be doubling the total run size (i.e., increasing it from 2.5 million adult fish to 5.0 million adult fish yearly), in a biologically-sound manner? (See pages 7-9.)

3. Area of emphasis. Should the Council's program continue to emphasize increasing runs above Bonneville Dam? (See pages 9-10.)

4. Approach to production planning. What would be the best approach to production planning in the Basin: a) Emphasize implementation and evaluation of program efforts (including planned hatcheries and draft amendments) before planning for additional hatchery production? or, b) Add focus on major new hatchery production by including planning for hatcheries in the subbasin planning process? (See pages 11-22.)

5. Future planning. Are policies needed in the following areas to guide production planning at the subbasin level and in related decision making?

a. Genetics. Should assessment of genetic risks be incorporated into subbasin planning and into decision making on ratepayer funding of any new production? Who should decide what level of genetic risk is acceptable? Using what process?

b. Use of hatcheries. Should the Council call for agreements by fishery managers on the use of hatchery production, with special attention to any conflicts between increasing harvest, continuing mixed-stock fisheries and protecting depressed (wild or natural) stocks? What forum and/or process should be used to develop the agreements?

6. Round table. Should the Council sponsor annual and five-year "round table" discussions of public reports on mainstem passage, harvest and escapement figures and trends, hatchery

production, natural and wild production, research and evaluation, and progress toward doubling runs and achieving other system objectives, by project operators and Bonneville Power Administration, harvest managers, hatchery managers, fish and wildlife and land and water managers, the proposed System Monitoring and Evaluation Work Group,[2] and the Council, respectively? Should the Council adopt a five-year planning and amendment cycle for its program to take into account trends indicated in the annual and five-year round table discussions?[3] (See page 23.)

Schedule for Comment

The schedule for discussion of this issue paper is as follows;

- November 12-13: Staff presentation of issue paper at Council meeting in Council hearing rooms, 850 SW Broadway, Suite 1100, Portland, Oregon.

- December 10-11: Public comment on issue paper at Council meeting in Seattle, Washington (location to be announced).

- October 22-December 15: Consultations on request.

- December 15: Written comment must be received in the Council's central office by 5 p.m., addressed to the attention of Janie Pearcy at 850 SW Broadway, Suite 1100, Portland, Oregon 97205.

- February 18, 1987: Council action on Draft Amendment Document, with appropriate revisions to reflect comment on this issue paper.

Comments on the related technical report should be addressed to the Council staff, also by December 15, 1986.

2/ See Draft Amendment Document at pages 31-33.)

3/ This would be in addition to any amendment proceedings initiated by the Council on its own motion (on its own initiative or in response to requests by others) and prior to major review or revision of the power plan. See 16 U.S.C. § § 839b(d)(1), 839b(h)(2); program section 1404.

I. INTRODUCTION

A. System Planning in the Columbia Basin

1. Background

In the Northwest Power Act, Congress directed the Northwest Power Planning Council to develop a Columbia River Basin Fish and Wildlife Program designed to protect, mitigate and enhance fish "affected by the development, operation, and management" of hydroelectric facilities in the Basin.[4] In February 1985, the Council adopted new program language to initiate a process for assessing salmon and steelhead losses attributable to hydropower facilities in the Columbia River Basin and for developing program goals, production objectives and a systemwide framework to address those losses.[5]

The "systemwide framework" was envisioned to include four principal elements: 1) a statement of losses, describing the salmon and steelhead production and production capability that has been diminished or destroyed by hydropower development and operations in the Columbia River Basin; 2) a statement of goals indicating the scope of fish production to be funded under the Council's program and the major policies for determining the types and location of production to be emphasized; 3) production objectives, the series of short-term, geographically-specific and biologically-feasible production targets planned to lead together, over time, to achievement of long-term basinwide goals; and 4) methods for measuring and accounting for progress towards goals and objectives. Taken together, these four elements are to give the program additional direction, indicate its scope, provide a yardstick for measuring its success, and help ensure that hydropower ratepayers do not compensate for fish losses caused by other factors. These elements also should make it easier to determine what measures are needed to protect, mitigate, and enhance fish by making it clearer what the program is intended to accomplish.

Major elements of the systemwide framework were developed earlier this year. In March 1986, the "Council Staff Compilation of Information on Salmon and Steelhead Losses in the Columbia River Basin" was released. It contained information indicating that: 1) Salmon and steelhead losses from all causes are about 7 to 14 million adult fish; 2) The decline in numbers of salmon and steelhead, combined with a shift of fish production from the upper to the lower Basin, has had a serious effect on Indian tribes; 3) There have been significant losses and degradation of salmon and steelhead habitat throughout the Basin; 4) Because of habitat losses, dam passage mortalities, and the mixed-stock ocean fishery, the greatest losses of fish runs have occurred in the upper Columbia and upper Snake areas; and 5) Most of the mitigation of the losses has been in the form of hatchery production, in the lower part of the Basin.[6] In June 1986, the Council estimated, in a proposed "statement of hydropower

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4/ 16 U.S.C. 839b(h)(1), (5).

5/ "The Council will assess salmon and steelhead losses attributable to hydropower development and operations, state goals, adopt objectives, develop methods for measuring progress toward goals and objectives, and otherwise provide a systemwide framework for program measures and action items." (Program Section 201, as amended (1985)).

6/ See Draft Amendment Document, Section 201 and Techical Appendix 2.

responsibility," that 5 to 11 million adult salmon and steelhead were lost due to hydropower operations and development.[7]

Planning for the development of system policies and production objectives, the second and third elements of the framework, was initiated in December 1985. Council-sponsored activities included a series of workshops designed to begin identification of habitat- and hatchery-related production opportunities; development of a system planning model to simulate all phases of the salmon and steelhead life cycle; funding of a genetics consultant to explore genetic issues; and circulation of an issue paper and two related technical discussion papers.[8]

A process that addresses the fourth element of the systemwide framework, methods for measuring and accounting for progress towards objectives, has been proposed in the Draft Amendment Document.[9] A system monitoring and evaluation work group is suggested to facilitate development of these methods. The system planning model also will be used to aid program evaluation and monitoring.[10]

This issue paper continues the discussion of the second element of the systemwide framework, concerning policies for determining the types and location of production to be emphasized. Because fish production is integrally linked to passage improvement and harvest management,[11] the policies must take all three interdependent types of action into account to provide the systemwide perspective called for by the Northwest Power Act.[12] The policies proposed are not detailed, but they should provide a common set of principles to link the subbasin plans into a systemwide program. Most specific questions related to production would be addressed in subbasin planning, which should provide the third element of the systemwide framework.[13]

7/ See Draft Amendment Document, Section 202, and proposed Technical Appendix 3: Numerical Estimates of Hydropower Responsibility.

8/ See the Issue Paper on Salmon and Steelhead Planning (June 1986), Technical Discussion Paper on Columbia River Basin Fishery Planning Model (June 1986), and Technical Discussion Paper on Genetic Considerations in Salmon and Steelhead Planning (June 1986).

9/ See Draft Amendment Document, Section 205 (e).

10/ See Council Staff: Technical Planning Report discussion on the system planning model.

11/ The interrelationship of the three elements of system planning (passage, harvest, production) can be represented as a triangle (see Figure 1 in the Council Staff: Technical Planning Report). These three elements each have independent planning aspects, but the elements are not independent and must be integrated to provide guidance for subbasin planning.

12/ 16 U.S.C. 839 et seq.

13/ See Draft Amendment Document, Section 204.

The fish and wildlife agencies and Indian tribes also are engaging in planning related to system policies and production objectives in the context of United States v. Oregon[14] negotiations and Pacific Salmon Treaty implementation.[15] In U.S. v. Oregon the parties have, for the first time, attempted to lay the groundwork for a comprehensive plan for managing harvest and production of anadromous fish stocks. The parties' goal would be to begin rehabilitating upriver runs through regulated harvest and modifications in hatchery production over the next five years. For the longer term, the goal would be to develop subbasin and tributary harvest and production plans to rebuild runs above Bonneville Dam. A Production Advisory Committee would coordinate, review, and analyze artificial and natural production programs. At least every five years, the committee would prepare detailed reports on fish production efforts. Annual production reports also would be issued and procedures followed to facilitate communication and resolve disputes outside of court whenever possible.[16] The newly-formed Columbia Basin Fish and Wildlife Authority, with membership including the parties to U.S. v. Oregon as well as others, should help facilitate coordination of salmon and steelhead production and management.

In the Pacific Salmon Treaty, the United States and Canada have committed to regulate harvest and cooperate in rebuilding naturally spawning chinook stocks in the Columbia River. The parties have established a technical committee to evaluate the status of these stocks, to determine whether management actions are meeting rebuilding objectives, to recommend strategies for the effective use of enhanced stocks, and to propose research to implement and assess the rebuilding program. Increases in harvest under the treaty are tied to the success of each nation's enhancement programs.

Just as any successful rebuilding program requires close coordination between the U.S. v. Oregon agreement and the U.S.-Canada Treaty, the Council's production objectives, policies, and measures should be coordinated with both. It is the Council's intention that the policies discussed in this issue paper and the objectives formulated in subbasin planning will build upon the framework established by these landmark efforts.

This paper proposes that the Council set doubling of runs as the interim objective for rebuilding runs and state that the emphasis in achieving that objective will be on stocks above Bonneville Dam. It describes two production policy approaches to that objective. One calls for planning with an emphasis on deliberate design of action to increase knowledge about production before deciding on any new hatcheries in addition to those in the current program, the Draft Amendment Document and other firmly planned ratepayer funded production; the other assumes major hatchery construction will be

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14/ United States et al. versus State of Oregon et al. Civil No. 68-513 (D. Ore.). Parties include: Confederated Tribes of the Warm Springs Reservation of Oregon, Confederated Tribes and Bands of the Yakima Indian Nation, Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe, the Shone-Bannock Tribes, the States of Oregon, Washington, and Idaho, and the United States.

15/ Treaty Between the Government of the United States of America and the Government of Canada Concerning Pacific Salmon (1985).

16/ As this paper is written, some, but not all parties, have signed the U.S. v. Oregon agreement, which had not yet been filed with the court.

necessary and desirable to increase runs substantially and would begin planning for that additional production now. The issue paper assumes the Council will continue its recognition of the authority and responsibility of the fish and wildlife agencies and tribes to manage harvest, to stress the need to improve passage and flows to aid fish migration, to emphasize the need for increasing the effectiveness of existing hatcheries already producing in the Basin, and to highlight the interest of the hydropower ratepayers in gene conservation to aid long-term returns on investments.

II. SYSTEM OBJECTIVE AND POLICIES

A. Interim Objective

1. Doubling as a Planning Concept

Hydropower responsibility for Columbia Basin salmon and steelhead losses has been estimated to be about 5 to 11 million adult fish. This responsibility is in addition to the estimated current annual Columbia Basin run size of about 2.5 million adult salmon and steelhead.[17] The feasibility and desirability of producing 5 to 11 million more adult salmon and steelhead is unknown.

The objective of doubling Columbia Basin salmon and steelhead run sizes is proposed here as an interim objective for planning purposes and for measuring and evaluating program progress. This objective would not necessarily be final. Efforts to meet the interim objective of doubling would be tested and results evaluated to determine the appropriate level of increases of Columbia Basin runs over the long-term. The proposed objective of doubling runs would apply to the Basin as a whole; not all species in all subbasins necessarily would be doubled. Means and locations for increasing production would be identified in subbasin planning.[18]

The setting of a numerical objective could guide planning and provide a context for evaluation of program progress. An ambitious, yet realistic objective also may provide incentives for innovation, creative thinking, improvements in communication and institutional arrangements, and development of management agreements in subbasins. It also could provide an added signal that the program is a serious long-term effort to solve complex problems not amenable to quick-fix remedies. In setting doubling as an objective, however, it would be important to avoid a numbers-driven program which ignores or downplays other important values, such as genetic resource management, and to make it clear that it may not be possible to double runs, so harvesters' expectations should not be too high.

If runs can be doubled, the amount of time necessary may vary, depending on a number of factors, including the policies associated with mainstem passage, harvest regulation, and fish

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17/ See Draft Amendment Document, Section 202.

18/ A possible starting point for dividing the increased production necessary to double the basinwide run size would be to allocate one-third of this increase to each of three areas above Bonneville Dam (i.e., subbasins between Bonneville and McNary dams, mid-Columbia River subbasins, and Snake River subbasins). Then plans for subbasins within each area could address how each would contribute to the area objective. (See Council Staff: Technical Planning Report.)

production.[19] For this reason the time frame necessary to reach doubling would not be estimated before subbasin plans are complete.

2. Feasibility of Doubling

The feasibility of doubling the current Columbia Basin run size can be evaluated in light of the following two parameters: 1) estimates of production increases expected from the program, proposed in the Draft Amendment Document, and other firmly planned production to be funded by ratepayers; and, 2) the estimated natural carrying capacity of the Basin.

Some potential production increases from the program will come from measures dealing with habitat and tributary passage improvements, hatchery improvement and construction, and mainstem passage and flows. Any estimates of increases are necessarily based on assumptions that may not be borne out in reality. The following estimates should be read in that light.[20] Habitat and tributary passage measures in the existing program could produce an estimated 400,000 to 500,000 adult fish. The hatchery measures (Yakima, Umatilla Steelhead and the proposed Northeast Oregon hatcheries, and improvements at existing hatcheries) in the current program and Draft Amendment Document could produce about 200,000 to 400,000 adult fish. Other firmly-planned production funded by ratepayers, based on the anticipated capacity of currently-planned Lower Snake River Fish and Wildlife Compensation Plan hatcheries (i.e., Clearwater and Magic Valley hatcheries), could increase runs by an estimated 45,000 to 50,000 adult fish. It is estimated that mainstem passage and flow measures in the current program could increase current run sizes further by an estimated 50,000 to 60,000 adult fish.

The total estimated increases from ratepayer-funded projects is roughly 700,000 to 1,000,000 adult fish. Therefore, to double the Columbia Basin run size, an additional 1.5 to 1.8 million adult fish would need to be produced beyond the production currently planned.

One way to produce a portion of the additional 1.5 to 1.8 million adult salmon and steelhead necessary to double the Columbia Basin fish run would be to use all currently available habitat to full potential.[21] Current natural production basinwide is estimated to be approximately 600,000 to

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19/ This staff proposal is in contrast to suggestions of some groups that doubling can or should be achieved in a set amount of time. The Pacific Northwest Utilities Conference Committee stated, at consultations and in comments on the hydropower responsibility issue and in comments on the Salmon and Steelhead Planning Issue Paper, that doubling in 10 to 15 years would be a reasonable objective for the Council's program. The Columbia Basin Fish and Wildlife Council, in comments on the Hydropower Responsibility Issue Paper, Salmon and Steelhead Planning Issue Paper, and Draft Sixth Annual Report of the Pacific Northwest Electric Power and Conservation Planning Council, has requested that the Council set an interim program objective of doubling or tripling in 16 years.

20/ See Council Staff: Technical Planning Report for explanation of calculated numbers that follow.

21/ However, much of this natural production probably would depend on hatchery outplantings to currently unused or underused existing habitat because mainstem passage survival rates for stocks produced in the upper Basin preclude adult returns sufficient to seed natural production

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700,000 fish. Potential natural production is estimated to be approximately 1.7 million fish. The difference between potential and existing natural production is about 1.0 million to 1.1 million. As noted above, about 400,000 to 500,000 of the 1.0 to 1.1 million may be realized through existing program measures. Additional measures would be needed to realize the remaining 600,000 to 700,000, and total production still would fall short of doubling.

Another way to produce additional fish is by constructing new hatcheries beyond those currently planned. However, at this time there is insufficient information to estimate the number of hatchery sites available or the number of fish that hatcheries at those sites could produce. Current information indicates that sites may be limited by adequate water supplies and potential capacity may be limited by problems of disease control, brood stock availability, and other problems related to reliability.[22]

In conclusion, it appears that one-half or less of the objective of doubling may be reached without construction of hatcheries beyond those planned. This is a speculative conclusion at best, as is the premise that the remainder of the fish needed to double the run size could be produced by hatcheries. However, an interim objective of doubling may be a useful management tool for the reasons stated above. In the Draft Amendment Document, it is proposed that five-year checkpoints be established to evaluate progress in meeting, and the feasibility of, the program objective, among other purposes.[23] At these checkpoints it will be appropriate to make determinations that less or more than doubling is feasible.

B. Area of emphasis.

The emphasis of the Council's program from the beginning has been on the area of the Columbia Basin from Bonneville Dam upstream.[24] This emphasis is consistent with information indicating that the greatest losses of fish runs have occurred in the upper Columbia and upper Snake areas, and most of the mitigation for these losses has been in the form of hatchery production in the lower part of the Basin.[25]

(Footnote 21 Continued from Previous Page)
areas to full potential. See Council Staff: Technical Planning Report discussion about the planning model. Also, see Council Staff: Technical Planning Report discussion on production estimates for explanation of calculated numbers that follow.

22/ See pages 12-22 for a description and analysis of this production planning alternative.

23/ See Draft Amendment Document, sections 203, 204 and 205.

24/ See, e.g., Program sections 704(d)(1)(A)(xi), 704(g), 1503, 1504 (Action Items 32, 34).

25/ See the "Council staff Compilation of Information on Salmon and Steelhead Losses in the Columbia River Basin" (March 1986), and Technical Appendix 2 to the Draft Amendment Document (September 1, 1986), at pages 5-6 and 96-232. "Reprogramming" of existing lower river hatchery production to provide releases of juvenile fish upriver from the hatchery locations is intended, at least in the short term, to rectify the situation that most of mitigation for losses has occurred in the lower river. See program section 201 (at page 12), 704(g), 1503 (at page 109), 1504 (at page 117), and 1504 (action items 34.27, 34.28, 34.29, and 34.30).

Emphasis of the program in the upper area of the Basin does not mean the program will not address lower area losses. However, such a policy would call for the majority of the program's efforts (resources and funds) to be directed above Bonneville Dam. It also would mean that subbasin planning should commence above Bonneville Dam first and that implementation of measures in subbasins above Bonneville Dam would take precedence over those in subbasins below Bonneville Dam.

C. Policies

1. Current Policies and Measures

The Council's program and draft amendments represent a substantial commitment to rebuilding salmon and steelhead, and contain a number of explicit or implicit objectives, policies and measures on harvest, passage and production. The objectives and policies discussed in this paper should be read in that context, since they would amplify or clarify those objectives, policies and measures, not replace them.[26]

The Council already has stated that a major program objective is to improve mainstem passage and flows to protect juvenile outmigrants, through a mix of actions that include the Water Budget, interim spill, installation of bypass systems, transportation, and related research and evaluation.[27] It recognizes the authority of the fish and wildlife agencies and tribes to regulate harvest, the interest of the ratepayers in protection against paying for salmon and steelhead losses due to overfishing, and the need to increase yields to the fisheries in a sustained manner.[28] The Council already has recognized that rebuilding upriver runs will require a mix of production efforts, including habitat and tributary passage improvements, improvements in production at existing hatcheries, construction of some new artificial production facilities, reprogramming of lower river hatcheries, and a substantial research, testing and evaluation effort.[29] It tentatively has concluded that currently available habitat should be used more fully before new habitat is opened up.[30] It has emphasized the need to conserve gene pools; to integrate hatchery, natural, and wild production; to address impacts on natural and wild fish

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26/ The staff also assumes the objective and policies discussed here would be carried out in a manner consistent with the standards of the Northwest Power Act (e.g., would complement the activities of the fish and wildlife agencies and Indian tribes, etc.). See 16 U.S.C. 839b(h).

27/ See sections 300-304, 400-404, 1503 (at pages 109, 110), 1504 (action items 32, 33) in the 1984 program and draft sections 203(b), 205(c)(1)(D), 205(d), 300-304, 400-404, 1503, 1504 (action items 32, 33) in the Draft Amendment Document. See the Council Staff: Technical Planning Report for more information.

28/ See sections 501-504, 1503 at pages 107 (annual reports on harvest controls) and 110 (harvest controls), and 1504 (action item 38) in the 1984 program, and draft sections 201, 202, 203(a) in the Draft Amendment Document.

29/ See sections 704, 1503 (at page 109), 1504 (action item 34) in 1984 program, and draft sections 205, 704, 1503, 1504 (action item 34), in the Draft Amendment Document.

30/ See Draft Amendment Document at sections 704(d)(1) and 1504 (action item 34.5, 34.02).

caused by mixed-stock fisheries, to give priority to improving and reprogramming existing hatcheries over building new ones, and to design new hatcheries to increase knowledge of the effect of hatchery production on natural populations.[31] The Council also has approved an adaptive management policy to recognize and address scientific uncertainty in the course of taking action to protect and rebuild runs.[32]

The production planning alternatives described below should be viewed in this context. The first alternative would add emphasis on evaluation before planning major new efforts. The second assumes hatcheries will be needed, can be used effectively, and should be planned now.

2. Alternative production policies

a. Alternative 1: Added Emphasis on Evaluation

This alternative calls for planning with an emphasis on deliberate design of action to increase knowledge about production before planning new hatchery programs. Monitoring and evaluation are key to this alternative. The doubling objective, discussed above, would be used only as preliminary guidance in the subbasin planning process. Construction of new artificial production facilities would be limited over at least the next 15 years to artificial production facilities that are in the current program, proposed for amendment into the program in the Draft Amendment Document, or otherwise firmly planned (i.e., Lower Snake River Fish and Wildlife Compensation Plan hatcheries).

This alternative recognizes there is a great deal of uncertainty about the most effective ways of increasing production so that viable wild, natural, and hatchery populations can be maintained in upriver areas where dams, habitat degradation and other constraints can hamper production.[33] In fact, the methods proposed for enhancing upriver runs have never been applied before on such a large-scale controlled basis. As a result, much is unknown about the most biologically-effective ways of doing the task.

Rather than postpone action in the face of this uncertainty until research results can give more definitive answers to management questions, this proposal envisions the existing Fish and Wildlife Program as a kind of research program itself. Each action, whether it be a hatchery or a habitat improvement project, has the potential for being an experimental probe into the natural system. As a result, this alternative envisions implementation being somewhat different from the way projects have been carried out in the past in the Columbia River Basin. Significant emphasis, including money and resources, would be placed on experimental design, determine how best to intermix wild, natural and hatchery populations, and on improved monitoring and evaluation.

31/ See sections 703, 704(g), 704(h), 704(i), 704(k) and related action items and sections in the Draft Amendment Document.

32/ See program sections 1503 (at page 108 and 110) and 1504 (action item 39.4).

33/ See Council Staff: Technical Planning Report discussion on modeling for examples of constraints that might hamper production.

This alternative would require a period of at least three life cycles (about 15 years for chinook) to determine the potential of rebuilding runs. It is anticipated that no planning for additional hatcheries would occur until this potential is known. The products of subbasin planning under this alternative would include an inventory of habitat and tributary passage projects, plans for evaluation and monitoring, and other elements in the Draft Amendment Document.[34]

b. Alternative 2: Added Emphasis on Hatchery Planning

This alternative relies on the premise that the potential for wild and natural production and existing artificial production (in the current plan, in the Draft Amendment Document and otherwise firmly planned) is insufficient to rebuild fish runs substantially, so planning for additional artificial production is needed now. It also assumes that substantial increases in hatchery production are feasible and biologically sound. Planning for additional hatchery production, including siting and development of production management plans, would be initiated in the subbasin planning process.

Since this alternative seems to offer the greatest chance for increased hatchery production, it also may lead to increased harvest pressures on some stocks. As a result, fishery managers would need to plan to address that pressure and to face the trade-offs required when substantial increases in production of at least some stocks require choices between mixed-stock fisheries and protection of natural and wild stocks. Given the potential conflicts, it may be appropriate to require agreement by the fishery managers on management of additional artificial production before the Council approves ratepayer funding of artificial production beyond the current program. This agreement would include resolution of the wild and natural fish protection/ mixed-stock fishery conflicts based on the premise that it is not possible to increase production, protect wild and natural fish, and increase mixed stock fisheries at the same time. This alternative also would include monitoring and evaluation.

The major difference between this alternative and alternative 1 is that additional artificial production would be anticipated and planned in the subbasin planning process. Under this alternative, subbasin planning would include agreements on management of new hatchery production. These agreements would need to resolve the mixed-stock fisheries and wild and natural fish protection conflicts associated with any new hatchery production. Subbasin planning products under this alternative also would include identification of hatchery sites, release sites, production profiles, including number of fish to be released annually, expected adult returns, and preliminary costs, as well as an inventory of habitat and tributary passage projects, plans for evaluation and monitoring, and other elements outlined in the Draft Amendment Document.

c. Considerations

Decisions involving planning for investment of ratepayer funds in production of Columbia Basin salmon and steelhead require analysis in terms of the risks entailed, the extent of contribution to increases in sustained yield, the time needed to realize an objective, relative cost (including the needs for institutional commitment and support associated with the alternatives), and likelihood of reducing uncertainty. An appreciation of these considerations is essential to understand the potential implications of the alternative approaches to planning. Following are discussions of these considerations and a matrix that analyzes the two production alternatives, described above, in light of these considerations.

34/ See Draft Amendment Document, Section 204.

1) Risk

Planning of salmon and steelhead production entails certain risks because of: 1) lack of knowledge regarding factors which may be crucial to fish production, and 2) natural (random) variation. The latter includes variation which may be reduced by further research, as well as variation resulting from factors about which testable hypotheses cannot be generated. Risk also arises from factors such as genetics and hatchery management practices that are not easily quantified or have not received sufficient study to be quantified.

a. Genetic risks. Genetic risk is the potential for losing genetic traits that add to the resiliency and survivability of the population. In a pristine environment, fish from each subbasin, and perhaps even portions of subbasins, contain unique gene pools that provide physical and behavioral characteristics that enhance survival. Within the fish population of a large and diverse basin such as the Columbia, a high degree of diversity among gene pools should be present so that the population contains survival traits encompassing a wide range of environmental and physical conditions. These characteristics include resistance to disease, behavioral traits that result in spawning and outmigrating occurring when environmental conditions are optimum for overall survival, and optimum body size of adults or juveniles.[35]

Artificial production can result in the loss of genetic traits, and a decrease in the genetic diversity of the population. Efforts to increase production through the use of hatcheries may decrease the diversity of gene pools within the population as the result of mixing of stocks, competition of released juveniles with wild juveniles, interbreeding of hatchery and wild adults, and the diminution of less productive stocks by mixed-stock fisheries.

Hatchery techniques also can decrease the genetic diversity of the population by selecting for traits that are either convenient for hatchery production or traits particularly suited for survival in the hatchery. For example, brood stock may be selected during a narrow portion of the return timing thereby eliminating early or late returning individuals from the gene pool.

Genetics is a particularly difficult risk to quantify or consider in decision making. Nonetheless, failure to address genetics poses potentially great risk because the loss of genetic traits is probably irretrievable.

b. Production risks. In addition to genetic risks, hatcheries present risks of reliability of production. Hatcheries have had a variable record of success in the Columbia Basin. Disease has been a persistent problem, resulting in marked variability in returns from year to year. For instance, Dworshak National Fish Hatchery in Idaho recently lost at least one-half million steelhead fingerlings to IHN (infectious hematopoietic necrosis). In the past four years, Dworshak has lost millions of steelhead fry to this disease.[36]

35/ Ricker, W.E. 1972. Hereditary and Environmental Factors Affecting Certain Salmonid Populations in The Stock Concept in Pacific Salmon: A Series of Papers Presented at a Stock Identification Workshop at the Montlake Biological Laboratory. Seattle, WA., April 8, 1970. Editors R.C. Simon and P.A. Larkin.

36/ "Disease kills 500,000 steelhead at Dworshak hatchery." Idaho Statesman. August 13, 1986.

Even without overt disease problems, hatcheries have shown unexplained variability in returns. Spring Creek National Fish Hatchery on the Bonneville Dam reservoir, for many years the mainstay of the Washington troll chinook fishery and lower river gillnet fisheries, recently has experienced very low returns.[37]

2) Contribution to sustained yield

This consideration evaluates relative ability to increase sustained yield. Sustained yield is the amount of fish in excess of spawning needs (harvestable adults) that can be maintained over the long-term by any given set of system policies and environmental circumstances.[38] Generally the larger the sustained yield that can be produced in a biologically-sound manner, the better. Production policies can affect the level of yield that can be sustained significantly because these policies decide the size of the bank account from which withdrawals (mainstem passage mortalities and harvest) are made.

3) Time needed to increase runs substantially

This consideration addresses the relative amount of time likely to be required to increase salmon and steelhead run size substantially. "Substantially," as used here, means to double run size.

4) Commitment and support

To be an effective guide to future action, any planning effort needs support, commitment, funding, participation and leadership by policy makers, recognition that the effort deserves significant attention, availability of needed technical expertise, and acknowledgment of options foreclosed and risks taken.

In this regard, it again is important to remember the context in which this future production planning will take place. The planning would occur while the Council, fish and wildlife agencies, Indian tribes, Bonneville, project operators, and others are working to implement a significant number of production, passage, and research measures in the Council's five-year action plan---and are experiencing difficulties in a number of implementing areas. Implementation entails major commitments of funding, time, resources, and leadership. The planning also would be initiated at a time when Bonneville is experiencing revenue shortfalls.

Associated costs would include at least direct costs and power system impacts. Direct costs are costs such as construction, operation, and maintenance for hatcheries and habitat improvement projects. Power system impacts are costs associated with providing spills or flows for fish that are required by different production alternatives.

The production planning alternatives are analyzed and compared below in terms of the additional commitments needed. They also are discussed in terms of the expectations each approach might raise.

37/ Vreeland, R. Evaluation of the Contribution of Chinook Salmon Reared at Columbia River Hatcheries to the Pacific Salmon Fisheries. Bonneville Power Administration. Annual Report FY 1985, Contract No. DE-AI79-84BP39638. October 1985.

38/ See Council Staff: Technical Planning Report.

5) Likelihood of reducing uncertainty

This consideration addresses the relative ability of production alternatives to reduce uncertainty, and increase scientific knowledge, a concept which is integral to the concept of adaptive management. The Council's policy of adaptive management calls for actions that maximize the learning potential while minimizing the number of bridges that are burnt behind us. This implies actions significant enough to result in a measurable change, a monitoring program capable of measuring the change, and an institutional structure that can adapt to the increased knowledge.

D. ANALYSIS

CONSIDERATIONS	ALTERNATIVE 1: ADDED EMPHASIS ON EVALUATION	ALTERNATIVE 2: ADDED EMPHASIS ON HATCHERY PLANNING
1. Risk	Emphasis on evaluation, monitoring and experimentation would allow more time to address genetic and production risks before decisions on new production are made and, therefore, as compared to alternative 2, should reduce the risk of failure. Failure might be defined as the lack of the Council's program to substantially increase Columbia Basin runs over the long term in a biologically sound manner while also providing knowledge about the system.	This alternative includes evaluation, but does not necessarily wait for results before proceeding with hatchery planning. Hatcheries could affect the genetic diversity among populations; those genetic differences that allow populations to adapt to particular niches within the environment. Planning for more hatchery production does not by itself create a greater risk of failure. The risk here is that the plans will be implemented and then fail over the long term to meet the program's objective because of a loss of important genetic material or poor performance of an artificial production facility.
2. Contribution to Sustained Yield	The sustained yield capability of production through this alternative would be determined by the results of the evaluation that would take place over time. If a hatchery production emphasis eventually were found to be desirable through the initial program emphasis on evaluation, then the sustained yield under this alternative would equal that of alternative 2, but accomplishment of the higher sustained yield would be delayed for the amount of time necessary to reach this conclusion.	If it can be assumed that hatcheries will be successful in producing the desired capacity over the long term, then this alternative will produce a larger sustained yield than alternative 1 at a faster pace at least in the short term. If hatchery production is unsuccessful and/or affects wild and natural production in a permanently disabling manner, such as loss of vital genetic information from fish stocks, then the long-term sustained yield under this alternative may be less than that of alternative 1.

3 Time needed to increase runs substantially	Because of the experimental emphasis of this approach, at least the next 15 years would be used to determine the most effective methods of increasing production, particularly for supplementing natural production and for experimenting with implementing hatchery production so that it does not interfere with the continued health of wild and natural populations. For this reason, if massive hatchery production upriver is feasible and desirable over the long term, its planning and implementation would probably take more time than under Alternative 2 because it would not begin immediately. However, if a hatchery emphasis is found to be undesirable in the future, this alternative could be quicker than Alternative 2 to increase runs substantially.	Because this proposal anticipates initiating hatchery planning in conjunction with subbasin planning, major new production could probably come on-line sooner than under Alternative 1. The risks associated with hatcheries, however, would be the same as they are now so success of this alternative in increasing runs substantially in a long-term sustained way is speculative.
4 Commitment and Support	Added focus on basinwide evaluation would require funding and staff to develop a new type of experimental design, set up related data collection efforts, analyze results, and articulate results in terms of management implications. Because this kind of approach is relatively new and untried in a large-scale setting, the expertise needed may be scarce, and it could take some time to train new experts. Because of the nature of the salmon and steelhead life cycles, a basinwide experimental approach also would require a sustained commitment of funds for data collection and other evaluation tasks through the full three brood cycles, to	Added focus on hatchery planning would require funding and staff over and above current levels, to identify appropriate hatchery sites, and to develop production profiles, conceptual designs, management policies and procedures, monitoring and evaluation, cost estimates, studies, and other elements of the type of "master plans" needed to minimize risks associated with hatcheries. Experience with the master planning for the Yakima outplanting facility has shown so far that it is a complex technical and policy process, requiring a new kind of perspective and expertise not widely available. Given demands now for funds and effort to implement the program, this approach is

provide reasonably reliable results. Mid-term funding cuts could hamper the effort substantially. From the perspective of a decision maker facing demands for more fish to catch, this alternative also would require a steady and determined eye on future benefits, more subtle than the immediate appeal of new hatchery production.

Implementation of the program, with an emphasis on evaluation, probably would not significantly increase direct costs because the existing program calls for monitoring to facilitate evaluation. Opportunities for some land and water development could be precluded in at least the next 15 years to provide "control areas" for research and evaluation. The impact of cost to the power system by this alternative could vary. Through emphasis on evaluation, monitoring, and experimentation, a technique may be found to significantly improve mainstem passage survival with reduced flows and spills. Conversely, it may be shown through evaluation that greater spills and flows are necessary to significantly increase runs.

likely to stretch current capability and require even more careful articulation of priorities.

Mid-term funding cuts may be less disruptive than alternative 1 because hatchery planning is not tied to the life cycles of the fish. However, initiation of a major hatchery planning process could raise expectations that the hatcheries will be built and that they will work, leading to increased harvest pressures, diminished attention to genetic concerns and reduced consideration of the results of evaluation and research.

Initially, a major increase in the size of the hatchery system would greatly increase the direct costs to the program. Bonneville estimates it would cost about $548 million to produce about 2 million more adults with hatcheries. (Based on average costs of about $41 per pound for 13.3 million pounds of hatchery capacity. See October 1986 Draft of Qualitatively and Quantitatively Improving Artificial Propagation of Anadromous Salmonids in the Columbia River Basin. Bonneville Power Administration at pages 15-17.)

This alternative may coordinate best with hydropower system needs if it is possible to arrange hatchery production such that release times can be coordinated with flow releases for power purposes.

5. Likelihood of reducing uncertainty	An emphasis on evaluation makes reducing uncertainty a primary theme. The purpose of reducing uncertainty is so that decisions can be made in a manner that minimizes the number of bridges burnt behind us or, in other words, to limit the number of opportunities that are lost. This alternative has a higher likelihood of reducing uncertainty than alternative 2.	This alternative probably has less likelihood than alternative 1 of reducing uncertainty because evaluation is not its primary theme, and hatchery planning would begin in the immediate future, without the results of further evaluation. However, it could reduce uncertainty eventually because evaluation and monitoring of program actions still will occur under this alternative.
6. Summary of major advantages and disadvantages	Major advantages of this alternative are that it probably is less risky and less costly in the near term in the areas of direct costs for hatchery construction, operation and maintenance. It also has more likelihood of decreasing uncertainty. A major disadvantage is that it could delay major production increases.	The major advantage of this alternative is that it could potentially increase fish runs in a relatively short period of time and potentially to greater levels of magnitude. Major disadvantages are a greater genetic and production risk because of the emphasis on hatcheries, and therefore, greater long-term risk of failure. Also, direct costs for hatchery construction, operation and maintenance would be significantly higher than for alternative 1. Commitment and support requirements, associated with the time, resources and leadership of the involved entities, probably would be greater under this alternative.

III. FUTURE PLANNING

The purpose of this issue paper, as stated above, is to stimulate discussion of system framework planning. The objective and policies that result from discussions on this issues paper, together with existing program policies addressing mainstem passage, harvest regulation, genetic conservation, and adaptive management, can form a system framework for future planning.

The next step proposed is the subbasin planning process, as outlined in section 204 of the Draft Amendment Document and in the Technical Planning Report released with this paper. It is anticipated that subbasin planning would commence in 1987. The system framework should provide guidance for this process. The staff welcomes comments and questions on the technical report now, but the main purpose of releasing it at this time is to provide background for future discussions.

Future planning also could include annual and five-year "round table" discussions of public reports on activities that affect the passage, harvest and production of Columbia Basin salmon and steelhead, for coordination and accountability purposes. For instance, public reports on mainstem passage, harvest and escapement figures and trends, hatchery production, natural and wild production, research and evaluation, and progress toward doubling and achieving other system objectives, could be prepared by project operators and the Bonneville Power Administration, harvest managers, hatchery managers, fish and wildlife and land and water managers, the proposed System Monitoring and Evaluation Work Group and the Council respectively. The annual discussions could aid coordination, assessment of progress, and identification of problem areas.

The five-year discussions could include review of program objectives, policies, goals, and consideration of program amendments.[39] A five-year interval has been proposed as reasonable for this purpose because trends are more visible from five years of data than from one or two years, this interval is keyed to the life cycles of salmon and steelhead, it provides a greater likelihood that program changes will be made on the basis of results of monitoring and evaluation, and it is tied to five-year review cycles in the U.S./Canada treaty and U.S. v. Oregon discussions. The trends identified during this review may show where modification of the program objectives, policies, goals, and measures are required.

Attachment: List of References

39/ This would be in addition to any amendment proceedings initiated by the Council on its own motion (on its own initiative or in response to requests by others) and prior to major revision of the power plan. See 16 U.S.C. § § 839b(d)(1), 839b(h)(2); program section 1404.

Attachment.

LIST OF REFERENCES

RELATED PROGRAM SECTIONS (Columbia River Basin Fish and Wildlife Program, as amended in 1984, unless otherwise indicated)

Program Goals: 201, 1504(36) [both as amended in 1985].

Mainstem Passage: 301-304, 401-404, 601-604, 1504 [including February 1986 amendments].

Harvest: 501-504.

Production (natural and wild, artificial, studies): 701-704, 901-904, 1504.

Interim goals, adaptive management: 1501-1503.

Roles, responsibilities: 104-108, 1301-1304, 1503 (at pages 106-107), 1504, 1600.

Amendment process: 1401-1404.

DRAFT AMENDMENT DOCUMENT (September 1, 1986)

Proposed amendments of sections listed above. See especially draft sections 201-205.

Proposed Technical Appendix 2: Compilation of Information for Salmon and Steelhead Losses in the Columbia River Basin

Proposed Technical Appendix 3: Numerical Estimates of Hydropower Responsibility

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Losses, Goals, and Program Planning Issue Paper (November 1984).

Accounting and Modeling Issue Paper (June 1985).

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